active materials, the array being situated within the gas mixture and having a substantially constant temperature of about 400°C or more;

(b) means for determining the electrical response value of each chemo/electro-active material upon exposure of the array to the gas mixture; and

(c) means for performing an analysis of the individual gas component from the electrical response values.

In yet another embodiment, this invention involves an apparatus for analyzing at least one individual gas component in a multi-component gas mixture, containing:

(a) an array of first and second chemo/electro-active materials, each chemo/electro-active material having a different electrical response characteristic upon exposure at a selected temperature to the individual gas component than each of the other chemo/electro-active materials, wherein the chemo/electro-active materials are selected from the pairings in the group consisting of

(i) the first material is M^1O_x, and the second material is $M^1_aM^2_bO_x$;

(ii) the first material is M^1O_x, and the second material is $M^1_aM^2_bM^3_cO_x$;

(iii) the first material is $M^1_aM^2_bO_x$, and the second material is $M^1_aM^2_bM^3_cO_x$;

(iv) the first material is a first M^1O_x, and the second material is a second M^1O_x;

(v) the first material is a first $M^1_aM^2_bO_x$, and the second material is a second $M^1_aM^2_bO_x$; and

(vi) the first material is a first $M^1_aM^2_bM^3_cO_x$, and the second material is a second $M^1_aM^2_bM^3_cO_x$;

wherein M^1 is selected from the group consisting of Ce, Co, Cu, Fe, Ga, Nb, Ni, Pr, Ru, Sn, Ti, Tm, W, Yb, Zn, and Zr; M^2 and M^3 are each independently selected from the group consisting of Al, Ba, Bi, Ca, Cd, Ce, Co, Cr, Cu, Fe, Ga, Ge, In, K, La, Mg, Mn, Mo, Na, Nb, Ni, Pb,

Pr, Rb, Ru, Sb, Sc, Si, Sn, Sr, Ta, Ti, Tm, V, W, Y, Yb, Zn, and Zr, but M^2 and M^3 are not the same in $M^1{}_aM^2{}_bM^3{}_cO_x$; a, b and c are each independently about 0.0005 to about 1, provided that a+b+c = 1; and x is a number sufficient so that the oxygen present balances the charges of the other elements in the compound;

(b) means for determining the electrical response of each chemo/electro-active material upon exposure of the array to the gas mixture; and

(c) means for performing an analysis of the individual gas component from the electrical responses.

In yet another embodiment, this invention involves a method for analyzing at least one individual gas component in a multi-component gas mixture, including the steps of:

(a) providing an array of at least two chemo/electro-active materials connected in parallel circuitry, each chemo/electro-active material exhibiting a different electrical response characteristic upon exposure to the individual gas component than each other chemo/electro-active material;

(b) exposing the array to the gas mixture ;

(c) determining an electrical response of each chemo/electro-active material upon exposure of the array to the gas mixture;

(d) determining a value for the temperature of the gas mixture independently of the determination of the electrical responses of the chemo/elctro-active materials; and

(e) digitizing the electrical responses and the temperature value, and calculating a value from the digitized electrical responses and temperature value to perform an analysis of the individual gas component.

In yet another embodiment, this invention involves a method for calculating the concentration of at least two individual analyte gas components in a multi-

component gas mixture having a temperature of about 400°C or more, including the steps of:

(a) providing within the gas mixture an array of at least three chemo/electro-active materials, each chemo/electro-active material having a different electrical response characteristic upon exposure to each of the individual analyte gas components than each of the other chemo/electro-active materials, wherein at least one chemo/electro-active material, when at a temperature of about 400°C or more, (i) has an electrical resistivity in the range of about 1 ohm-cm to about 10^5 ohm-cm, and (ii) exhibits a change in electrical resistance of at least about 0.1 percent upon exposure of the material to an analyte gas component, as compared to the resistance before exposure;

(b) determining an electrical response of each chemo/electro-active material upon exposure of the array to the unseparated components of the gas mixture; and

(c) calculating the concentration of each of the individual analyte gas components from the electrical responses of the chemo/electro-active materials upon exposure to the multi-component gas mixture only.

In yet another embodiment, this invention involves a method for analyzing at least one individual gas component in a multi-component gas mixture, including the steps of:

(a) providing an array of at least two chemo/electro-active materials, each chemo/electro-active material having a different electrical response characteristic upon exposure at a selected temperature to the individual gas component than each of the other chemo/electro-active materials, the electrical response characteristic of each material being quantifiable as a value, wherein the response value of at least one material is constant or varies by no more than about twenty percent during exposure of the material to an